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ABSTRACT

Elementary preservice teachers (n=185) in a blocked program of methods courses developed integrated thematic units focusing on social studies and science that viewed reading, language arts, and mathematics as tools students use to study the major content areas in the elementary school program: social studies and science. This was a complex task requiring both content and pedagogical knowledge. Those individuals subjects having the greatest difficulty conceptualizing and teaching the unit also sought the least help from course instructors. They had difficulty in constructing a unit rationale, choosing nontraditional assessments, and in choosing strategies other than lecture. Many could not initially integrate mathematics. Although cooperating teachers strongly encouraged the continued development of integrated thematic units they acknowledged that they were not sure that social studies was a major subject that should be taught daily and were uncertain that language arts, reading, and mathematics should be considered tools children use to learn. (Author/SG)

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Integrated Units

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Integrated Teaching Units: Focusing an Elementary Methods Block Program
on Social Studies and Science

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RUNNING HEAD: Integrated Units

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Abstract

Elementary preservice teachers (n=185) in a blocked program of methods courses developed integrated thematic units focusing on social studies and science that viewed reading/language arts and mathematics as tools students use to study the major content areas in the elementary school program -- social studies and science. This was a complex task requiring both content and pedagogical knowledge. Those subjects having the greatest difficulty conceptualizing and teaching the unit also sought the least help from course instructors. They had difficulty in constructing a unit rationale, choosing nontraditional assessments, and in choosing strategies other than lecture. Many could not initially integrate mathematics. Although cooperating teachers strongly encouraged the continued development of integrated thematic units they acknowledged that they were not sure that social studies was a major subject that should be taught daily and uncertain that language arts/reading and mathematics should be considered tools children use to learn.

Integrated Teaching Units: Focusing an Elementary Methods Block Program
on Social Studies and Science

Methods classes preparing elementary teachers do not usually establish social studies as a primary content area in the elementary school curriculum. Often reading/language arts and mathematics are viewed as the core of the methods program. Yet reading/language arts and mathematics should not be an end in themselves but should quickly become tools students use to study the major content areas in the elementary school program -- social studies and science (Lockledge, 1993). Methods block courses need to foster preservice teachers' understanding of the primary role of social studies in the elementary program (Goodman & Adler, 1985).

At many institutions methods classes are taken separately and are not linked to each other in any way. A field experience may be part of separated courses, but often it is not. At other institutions methods classes are blocked. When they are blocked there are varying levels of teamwork between the methods classes. Frequently a shared field experience is associated with blocked classes (Lanier & Little, 1986). In either situation social studies frequently is not viewed as a core area.

The constructivist perspective indicates that students construct their own knowledge and values as a result of interactions with the social and physical world. Social studies and science consider these interactions and therefore, form the foundation of the elementary school curriculum as is evident when the following principles of constructivism and their implications for practice are considered. An important principal of constructivism states that students have an intrinsic desire to make sense of the world. This translates into the following teaching practices: creating learning activities that are meaningful and interesting to students; creating conditions in which students need to construct, develop, and apply additional knowledge or skills; providing activities that offer students choices and opportunities to function as planners, decision makers, and creators; and allowing sufficient time for students to pursue their ideas (Project Construct, 1993).

A second constructivist principal states that students actively construct knowledge and values by acting upon the social and physical world. Related teaching practices include: providing opportunities for exploration, interaction, and experimentation with peers, adults, and objects; helping students reflect on and evaluate their thoughts and actions; creating activities that allow children to make use of their knowledge in new situations; offering opportunities for students to cooperate and consider different points of view; and permitting students to use concrete actions to inform their decision making (Project Construct, 1993).

A third principal indicates that in their universal struggle to understand the world student's thinking will contain predictable errors. Related teaching practices include: valuing student's imaginative but often incorrect and illogical answers and ideas; encouraging peer interaction to discuss, question, and challenge each other's ideas; allowing all students to experience the consequences of their ideas and actions within reasonable constraints; facilitating students in finding answers to their own questions; and analyzing how and why students respond in certain ways (Project Construct, 1993).

A fourth principal indicates that developmental domains are interactive and interrelated, each influencing each other. It is within the sociomoral environment that cognition and language are furthered. Therefore an integrated approach to teaching should be emphasized with integration of "academic" instruction within contexts that are meaningful to the student; utilizing curriculum goals through activities that promote various aspects of development; and viewing learning as dynamic and organized rather than static and linear. (Project Construct, 1993). When social studies and science are viewed as the core of the elementary curriculum the enactment of these constructivist principles through appropriate teaching practices becomes possible.

Preservice teachers need to understand the primary role of the social studies in the elementary curriculum. One means of fostering such an understanding is to help preservice teachers in a blocked program plan an interdisciplinary unit around a social studies theme. Current literature and research support interdisciplinary teaming

approaches and curriculum integration in the elementary school and have shown significant benefits from their implementation (Lounsbury, 1984, Mancino, 1993). Teacher education programs are examining means by which preservice teachers can be given opportunities to develop units and materials that cross disciplines. Because of the prominent place language arts/reading and mathematics have had in the elementary school curriculum teacher education programs must articulate the rationale for the primary role of social studies and help preservice teachers acquire experience with teaching units that focus the curriculum on social studies themes.

For decades there have been concerns expressed regarding curricula designed solely around separate subjects (Mancino, 1993, p. 2). Yet Alberty and May (1987) reported that a review of twenty-five years of literature indicated that the traditional approach in elementary schools was pervasive (p. 322). The pervasiveness of a traditional, highly separated subjects approach has been supported by movements focusing on measurable outcomes, high stakes testing, and accountability according to Mancino (1993, p. 40) with a resultant fragmented curriculum lacking creativity and diversity. Recent education movements have also resulted in a focus on the areas most tested such as reading and a diminishing import for those areas given less time on the tests, typically social studies and science (Mancino, 1993).

The traditional design for organizing the curriculum is a fragmented model (Fogarty, 1991) dictating separate and distinct disciplines. Teachers generally are not able to make connections between broad outcomes and the disciplines they teach, due to their own socialization and education into becoming a teacher (Kraft & Black, 1993).

How can a preservice teacher education program involve students in developing and implementing an integrated thematic unit that focuses on social studies and science content and supports that content with lessons in mathematics, and language arts/reading? This problem was explored in a preservice teacher education program through considering the following questions.

1. What types of integrated thematic units are constructed by novice teachers?
2. What difficulties in conceptualizing an integrated thematic unit are

encountered by novice teachers?

3. What viewpoints do cooperating teachers regarding the integrated thematic units?

Methodology

The subjects of this study were preservice elementary teachers (n=185) were involved in a field-oriented teacher education program at The University of Alabama with a methods block. Of the 185 subjects, 177 were female and 8 were male. During the semester prior to student teaching, all elementary undergraduate education majors participated in an eighteen semester credit hour block of methods courses. These were courses in social studies, science, mathematics, and reading/language arts methods plus a course in classroom management. The social studies methods course focused on reflective decision making using the learning cycle as a model teaching strategy (Karplus, 1979 and Sunal & Sunal, 1991). As part of this methods block the novice teachers worked in their clinical field placement all day for a total of five weeks.

The preservice teachers planned and taught numerous lessons in each content area and also created and used teaching materials such as interactive bulletin boards, an author study, learning centers, and a map skills game. In the last half of the semester each preservice teacher identified a topic for the integrated thematic unit. The unit included miniunits in social studies, science, mathematics, and language arts/reading (a literature-based miniunit). Each miniunit was to have lessons that identifiably addressed the content of the area. Thus, each unit contained an identifiable social studies miniunit, an identifiable science miniunit, an identifiable mathematics miniunit, and a literature-based miniunit. The theme and specific topic selected was to be appropriate to both social studies and science. The mathematics miniunit was to support the topic and the content taught in social studies and science. The literature miniunit was developed last and supported the lessons developed for social studies, science, and mathematics.

Based on a pilot experience it was found that preservice teachers could not develop a completely integrated, interdisciplinary unit. When they attempted to do so

the unit often substituted reading a book for completing a survey or memorizing vocabulary words for exploring an idea. The social studies and science content often disappeared and were replaced with reading about something rather than doing it or memorizing lists rather than constructing them. It was evident that a completely integrated, interdisciplinary unit that incorporates the pedagogical and content knowledge appropriate to each content area is a complex and difficult entity to construct. The preservice teachers appeared to need to learn to construct a workable and meaningful social studies lesson and a miniunit thematically connected to workable lessons before they could develop lessons that integrated social studies with other areas. Therefore, it was decided that the integrated thematic unit would focus on a common theme that could be addressed by social studies and science lessons. Then the unit would be written around that theme with recognizable lessons focused on social studies, science, mathematics, and language arts/reading.

The social studies and science methods professors initially reviewed the preservice teachers plans for their proposed units. Then the mathematics instructor considered the mathematics content and its contribution to the theme. For example, simply replacing tiles with toy cars in a problem was not considered to be an instance of addressing a transportation theme through mathematics. The focus was on using mathematics to actually teach the theme. The language arts/reading instructor reviewed preservice teachers plans last since the literature miniunit was expected to support social studies, science, and mathematics and was developed after plans were refined for the rest of the unit.

The following ten step process was used in planning, implementing, and evaluating the integrated thematic unit.

1. Brainstorming ideas. Preservice students list terms, words and phrases they have for the miniunits for social studies, science, and mathematics
2. Name the integrated unit in order to arrive at a focus attempting to capture the importance or value of the unit, as well as its content
3. Identify focus questions to help students make a link with their prior

knowledge as well as establish a rationale for studying the unit

4. Identify intended learning outcomes

At this point the course instructors examined the products of these first four steps and provided feedback to each preservice student.

5. Categorize the intended learning outcomes into ideas and skills. Ideas included concepts, generalizations, attitudes, and values

6. Develop a web

7. Write a rationale

The course instructors examined the components preservice teachers had developed in steps five through seven and provided feedback.

8. Write objectives for ideas, process skills, and affects

9. Develop lesson plans

10. Develop an assessment plan that answers questions and provides feedback with regard to student learning and provides data with respect to the effectiveness of the lesson plans

The course instructors examined component eight through ten and provided feedback to the preservice students.

11. Implement the unit

12. Gather feedback and reflect on the unit.

The course instructors met as a group and jointly examined the components being submitted by the preservice teachers and provided feedback individually and in a voluntary group meeting. Preservice teachers were then encouraged to meet individually with course instructors to discuss the components they had developed.

As an example, an integrated thematic unit may focus on the theme of "change." More specifically, it might focus on the question "How have a set of five major cities in the U.S.A. changed in the last ten years?". A related mathematics lesson may work with graphing levels of pollutants found in the air in these cities at different points during the ten year period, while in science students may be investigating the causes of varying levels of pollutants on different days, and in language arts/reading the students

may read children's literature that centers on change in student's lives in cities.

The preservice students kept logs of discussions with course instructors as the unit was developed and taught. These logs were sent via a communications network to individual course instructors with a copy to the methods block coordinator. All communications were printed out and content analyzed. A record of consultations with course instructors regarding unit planning, implementation, and assessment was also kept.

The integrated thematic units were rated by each of the methods block instructors and by cooperating teachers to derive a score for planning. A teaching score was also derived based on the novice teacher's actual teaching of the unit. The following four criteria established by Shoemaker (1989) were considered in evaluation of the preservice teachers' units. First, validity within disciplines -- each concept is important to each discipline. Second, validity for the disciplines -- integration enhances learning. Third, validity beyond the disciplines -- integration enables students to go beyond even the parts of the various subjects to bigger ideas. Fourth, contribution to broader outcomes -- integration helps shape the learner's overall approach to knowledge.

Each preservice teacher and was interviewed in the second week of the semester prior to the initiation of unit planning and at the end of the semester after unit teaching and assessment had been completed. Cooperating teachers (n=185) completed an open-ended questionnaire that explored their reactions to the unit, difficulties it presented, and its effectiveness in teaching components of the elementary school curriculum. Ten cooperating teachers were chosen at random and interviewed on the topics addressed in the questionnaire.

Results

The results of the study are presented for each of the unit planning steps. These are followed by a report of interviews with cooperating teachers. Examples of preservice teachers' products for several of the unit planning steps above are given below to indicate how the units developed. The first step in planning was

brainstorming a topic. All of the subjects brainstormed lists of topic ideas with at least ten items in each with a range of up to twenty-seven topic ideas. An example of preservice teachers' brainstorming of the topic of transportation for two different grade levels follows.

Topic: Transportation (Fifth Grade Example)

velocity, communication, distance, energy, machines, fuel economy is a more important goal than status in designing a vehicle, road systems, observation, critical thinking, data gathering, interpreting charts, graphs, maps, traffic jams, engine design, speed, safety is less important to most people than is fuel efficiency, fuel economy in a vehicle, cost, ratio of speed to fuel to economy

Topic: Transportation (First Grade Example):

roads, classification of vehicles, observation, ordering, finding patterns, commercial and personal vehicles, wheeled and other vehicles, simple machines, travel time, safety, traffic rules and signs, distance, maps

The title given to a unit is a way of making sure that the initial ideas are logically connected to each other. The following are the names of some of the units that were developed by these preservice teachers.

Native Americans are Us	Transportation is How We Move People
Atoms, Molecules, and You	and Things
Australia is a Unique Habitat	The Global Economy
Mexico: A Land of Many Cultures	Conserving Our Environment
Living Things and How They Adapt	Involving Children in Social Action
Rules -- For People and in Nature	Sounds of Music
Using the Skies	

Some titles were written as a question, so that the lessons in the unit might serve to answer the question.

What are the Characteristics of a Global Economy?

What Steps can be Taken to Conserve our Environment?

How can Children be Effectively Involved in Social Action?

How do People and Things Move from Place to Place in Our Country?

Why Should we Consider Space Travel?

What Have Been the Critical Events in Space Travel?

The next step involved the development of focus questions. Both preservice teachers and course instructors examined them by asking the following questions. Which of the focus questions listed really get at the heart of the unit? What kinds of questions are being asked? Are they mostly where or when questions? Are there any how or why questions? To what extent do the questions relate to the students to be taught? Some examples of the focus questions developed by the preservice teachers follow.

How should people interact with the environment?

What can families do to prepare themselves for natural disasters such as tornadoes, floods, hurricanes, and earthquakes?

How can knowledge about atoms affect my choice of foods?

What are the major categories of transportation vehicles?

How has the most likely mode of personal transportation changed in this century?

Why is fast transportation an essential element of our society?

In examining the focus questions, fifty-five percent ($n=102$) of the preservice teachers were found to have few, if any, dealing with mathematics or science. Only three were lacking focus questions dealing with social studies. After receiving feedback from the course instructors preservice teachers rewrote their focus questions and added questions in areas that lacked them. After the rewrite, 31 preservice teachers (17%) were found to be lacking focus questions in mathematics and/or science. They received additional feedback and rewrote again. Four preservice teachers (7%) were still lacking focus questions in mathematics and science, received feedback and rewrote again. After this revision one preservice teacher needed additional feedback and rewrote the focus questions one more time before they were judged to be comprehensive.

Learning outcomes are the process skills, concepts, generalizations, attitudes, and values students are intended to learn. Many of these preservice teachers (84%,

n=155) found it difficult to separate learning outcomes from activities. Course instructors worked with these preservice teachers to assist them in separating outcomes from activities. Thirty-two percent (n=59) of the preservice teachers had to work with their list of outcomes two times after feedback in order to arrive at a list that included only outcomes. An example of one initial list is given below. Those items that are outcomes, not activities, are indicated by an "X".

- X Fuel economy
- X Land vehicles
- X Fuel economy is a more important goal than status in designing a vehicle
- X Velocity is important in a vehicle
- X Economic costs of various forms of transportation
- X Governmental planning to foster various forms of transportation
- X How to determine the ratio of speed to fuel to economy
- X Damage caused by earthquakes and other natural disasters to roads
- X Measuring the distance via different routes to a city
- X Speedometers
- Field trip to an automobile factory
- Using the computer to measure the fuel consumption of different cars
- X Finding patterns in traffic data

Preservice teachers next categorized their intended learning outcomes into two groups: ideas and skills. Many preservice teachers, (68%, n=126) found they had identified either one or no skills. In reconsideration of their intended learning outcomes after feedback from course instructors, most (95%, n=175) identified two or more process skills to be taught. Ten students went through an additional period of consideration in order to identify the process skills needed to teach their theme.

An example of partial webs for two units is given in Figures 1 and 2. Both webs connect main ideas and skills with process terms such as "inferred in". These terms are defining the learning in this content -- inferring, measuring, etc.

Approximately one-third (n=61) of the preservice teachers were initially unable to

conceptualize the unit in terms of a web. After receiving feedback and rewriting all but ten percent ($n=19$) were able to construct an integrated web. Of these nineteen, all but three were successful after a second round of feedback and rewriting. With a great deal of assistance, these three students had acceptable webs after a third round.

Figures 1, 2 about here

Next, preservice teachers wrote a rationale for their unit considering the following four questions: How does the unit affect the future of the students, as well as their individual needs and interests? How does the unit contribute to understanding societal issues and help students deal responsibly with them? How is the unit developmentally appropriate for the students? How does the unit reflect the spirit and character of inquiry, and the nature of the learning enterprise? The complete rationale was to contain a goal statement, as well a statement explaining how the unit attended to the conceptions of the student, society, and the nature of subject matter. As they developed the rationale, the preservice teachers were asked to think about the students they will teach, and how the content will relate to them. Next, they were to formulate the relationship between the unit's content and potential social issues that it brings up. Lastly, they needed to consider how they would approach the nature of subject matter in this unit. Somewhat more than half of the preservice teachers (56%, $n=104$) said they had great difficulty in constructing the rationale. They found that going to the state course of study was a good beginning point. They constructed a rationale based on fulfilling the state course of study requirements. After feedback about two-thirds of these students (66%, $n=69$) were able to complete a rewrite that expanded their rationale to what was deemed a successful consideration of the four questions above. Thirty-five preservice teachers still were unable to construct a complete rationale addressing all four questions. These received more feedback and completed a second rewrite. Six students repeated the process again and completed a third rewrite. At this point the course instructors decided that these six students should proceed to the next

step in their unit planning but that their rationales were only marginally acceptable.

Those who constructed an acceptable initial rationale (44%, $n=81$) had all voluntarily met with one or more course instructors and had discussed their ideas for their unit. In these discussions they reported trying to focus their ideas and narrow them so that they would be teaching fewer ideas and skills but teaching each in greater depth. As they made decisions, they constructed a rationale for those ideas and skills they kept and those that they decided to discard. When these preservice teachers began to construct their rationales they reported having an understanding of why they were planning to teach this particular set of content and found writing the rationale was a challenge but not really difficult since they had some idea of what they wanted to write. Of those who completed the rationale with just one rewrite, sixty-two percent ($n=43$) had voluntarily met with course instructors prior to writing their original rationale.

All the preservice teachers reported having difficulty addressing all content areas in their rationale. In particular they had difficulty integrating mathematics into it. Many (74%, $n=140$) said that they thought this difficulty resulted from their own personal perspective of mathematics as a separate stand-alone subject that occurred during a mathematics period and then was finished for the day. Some (27%, $n=50$) reported difficulty integrating science and social studies into the same rationale. This was particularly true for some themes that were strongly tied to one or the other content area such as Thanksgiving, magnets, the U. S. Constitution, and plants.

In the next step, preservice teachers revised their initial learning outcomes, wrote these statements as objectives, and categorized them into practical categories for teaching. The preservice teachers were told that there are many ways to write learning objectives. Whatever their specific format, they should focus on what you want the student to learn, communicate clearly your intentions, and indicate how success can be achieved. Some of the objectives developed included:

Objectives that indicated ideas (a concept or a generalization):

Students will give examples of how the climate influences the lives of people.

Given a list of famous people and their accomplishments, students will make a

list of the personal characteristics that have contributed to making people famous.

Students will give examples of pollution that they have personally read about or observed.

Students will define a want as something that a person would like to have.

Students will give examples of wants that they have.

Objectives that indicated process skills with which students will work:

Students will gather data by conducting a survey.

Students will organize data into charts.

Students will list their criteria and decision options in a chart form when making an economic decision.

Students will conclude that the price of their wants is greater than the amount of money they have.

Objectives that indicated attitudes or values with which students will work:

Students will share their knowledge about Native Americans with other people.

Students will stop using prejudicial language.

Students will demonstrate respect for the elderly.

Students will state that they respect the elderly because of the efforts they put into their work.

The initial set of objectives were accepted from 32% (n=59) of the preservice teachers.

Twenty-six percent (n=48) rewrote objectives because they focused on procedures the teacher would be carrying out rather than on what the students were intended to learn.

The other preservice teachers (42%, n=78) rewrote objectives because they were vaguely worded or confusing. Sixteen percent (n=30) rewrote objectives because they had both problems, a teacher orientation and vagueness. A second rewrite after feedback was required of twenty-eight percent (n=58) and a third rewrite was required of eleven percent (n=20). All of those whose objectives did not require rewriting had voluntarily met with one or more course instructors during the stage in which they were trying to focus their unit and write its rationale.

In the next step, preservice teachers listed the resources and resource strategies (activities) for the intended learning outcomes that had been developed. Then the set of lesson plans were drafted based on the rationale and learning objectives designed. At this stage of unit planning it was necessary to develop an assessment plan. It was to serve two broad purposes: a) answer questions and provide feedback with regard to student learning and b) provide data with respect to the effectiveness of the lesson plans. Preservice teachers could utilize a traditional approach such as the preparation of a quiz but were strongly encouraged to consider other forms of assessment such as a student writing project, artwork, a map, an interview, a portfolio of student work, or a group/individual project. The assessment instrument(s) were to evaluate each type of learning outcome in the unit: ideas, process skills, and affects. The preservice teacher should also ask the students for feedback on how they reacted to the unit and component miniunits. This assessment should, at a minimum, ask questions related to how satisfied students were as a learner, how the teacher could have increased their satisfaction, what their favorite activities were and what their least favorite activities were.

Most of the preservice teachers (85%, $n=157$) used nontraditional means of assessment. Of those preservice teachers using only traditional means of assessment ($n=28$) all had had to rewrite their unit rationales and objectives two or three times. Of those subjects using only traditional means of assessment fifteen received mostly negative feedback from their students when they asked about their reactions to the unit. Of those using nontraditional means of assessment, seven received a preponderance of negative feedback from their students. Those preservice teachers who used only traditional means of assessment reported in interviews that they felt uncomfortable with any other form of assessment, that they were unsure of how to interpret a nontraditional assessment, and that it was too time consuming.

After the preservice teachers had implemented their unit they gathered feedback and reflected on the unit. The questions they were asked to consider included:

1. What evidence of motivation to learn about the topic did you find?

2. What evidence of learning about the topic did you see?
3. To what extent did students attain the learning objectives?
4. Did the lessons flow together well?
5. What did the students remember and not remember from day to day?
6. Which lesson was the best? Why? Would you have predicted this?
7. Would you use this unit again in its present form? If not, how would you change it? What modifications would you make?

Overall, the preservice teachers noted that their students remembered much from the unit. Tying the topic into lessons from many content areas interested the students. In taped conversations one student said, "We learned lots. I liked my math lessons being about the Constitution. It was fun to look up and find out where the people at the convention came from and to graph the distance each one traveled to the Constitutional Convention. At first I had trouble figuring out the mileage and then figuring out how to graph it but it was a lot of fun. It seemed like we didn't have math class. Lots of the other lessons were fun too, but I really liked having this kind of math." Another student said, "I really liked the lessons we did on laws about the environment. I'm really interested in how laws get passed and in how people try to get the laws to be what they want. It was fun figuring out how some big some of the groups are and what percentage of people they influence. I can see how a lot of people don't know their science. They have opinions that are silly because they don't understand science. So they want laws passed that don't make sense to me because I know the science. "

Forty percent ($n=74$) of the preservice teachers felt that all the lessons did not flow together well. In all of these cases the preservice teachers were able to make suggestions for changing the lessons so that they would tie into each other more effectively. All of the preservice teachers would modify the unit in the future by adding more lessons. Many (87%, $n=161$) would modify it by attempting to strengthen the integration between the content areas.

Thirty-five percent ($n=65$) were surprised at which lesson was the best. In all

cases it was a lesson that was described as both hands-on and minds-on. In all but six cases, the students were working in cooperative learning groups for some portion of the lesson. Preservice teachers had predicted that this lesson would be difficult to manage and that their students would become rambunctious because they had limited experience working in cooperative groups and working with materials. However, they found that the students were engaged with the lesson's materials and activities, and with working with others and maintained a high degree of self control while enthusiastically carrying out lesson activities.

During interviews, students in the classrooms of all of those preservice teachers who had successfully conceptualized the rationale for the integrated thematic unit in their initial draft reported enjoying the units. These students said they liked working with the same ideas in different ways. They found it hard to identify a lesson with a particular content area, such as social studies or mathematics because "it all seemed to go together." Students in the classrooms of preservice teachers who had difficulty in conceptualizing the rationale for the integrated thematic unit often (71%) reported the unit to be uninteresting. They noted that there was a lot of teacher talk and not much opportunity for student activity. In these cases it appeared the unit was tied together in lectures but that the preservice teacher was unable to move into other sorts of approaches.

Scores derived for the preservice teachers planning and teaching of the unit indicate that approximately 68% (n=126) of the preservice teachers were able to plan and appropriately teach an integrated thematic unit whose core was composed of social studies and science content. Those preservice teachers whose unit components were consistently accepted initially or after a first rewrite, were better able to teach the unit although a large range of ability was demonstrated among them.

Interviews with cooperating teachers indicated that about 40% (n=74) found it difficult to work through the process because they could not accommodate themselves to the perspective that social studies and science should have such a central role in the curriculum. Most of this group of cooperating teachers (85%, n=63) also did not think

that it was possible to teach both social studies and science in the same day. They acknowledged that they would not teach reading and mathematics on alternate days but had difficulty finding the time to teach both social studies and science. They stated that they perceived language arts/reading and mathematics as ends in themselves rather than as providing tools and support for the content students learn in social studies, science, and other areas. They stated that they had difficulty conceptualizing a thematic unit because they thought it was difficult to tie areas of learning together. Despite their difficulties with developing and implementing an integrated unit whose focus is on social studies and science, only three of the teachers (6%) wanted the methods block course instructors to abandon the integrated thematic unit. The rest said that their students had enjoyed the unit and had learned a great deal from it. They agreed with one cooperating teacher who said "It's important to help children develop an understanding of the connections between the content areas. They need to realize that you 'do' social studies all the time, that you 'do' math all the time, that you 'do' science all the time and so on." Even though many were unwilling to assign social studies a primary place in the curriculum they encouraged the course instructors to continue this approach. One stated, "I find it hard to spend less time on language arts because it's so important for these children to learn to read and to write. Yet, I agree with you that there are some bigger things, and social studies is one of them. So, I think you should go ahead and keep trying to do this. I will help you because I really think this is the way to go. But I still have a hard time justifying it to myself."

Many of the cooperating teachers (67%, n=124) requested inservice from the course instructors to better prepare them for working on integrated thematic units with future methods block preservice teachers. They wanted a thorough discussion of planning procedures, scheduling, means of identifying commonalities between the course of study in various content areas, and means of assessment.

Conclusions and Implications

Conceptualizing, planning, and implementing an integrated thematic unit whose focus originates in social studies and science content is a complex task. It requires

determining commonalities that exist in the curriculum. In some cases commonalities are not obvious. One example comes from a unit dealing with native Americans. At first this seems to be a unit that clearly falls within the realm of social studies. The science is not evident. With some further thought a number of areas for related science learning emerge such as: native medicinal plants, archaeoastronomy, the chemistry of the materials used in making clay pots, and the classification of the seeds of typical food plants.

The process of establishing commonalities requires from preservice teachers a high level of content knowledge and a confidence that one is knowledgeable. It also requires pedagogical expertise that allows an individual to smoothly transit from one area to another keeping the theme and the flow of activities consistent. Some preservice teachers may lack the necessary content and pedagogical knowledge. To accomplish the integration of content areas, the preservice teacher must be capable of using combinatorial reasoning, processing multiple variables, making appropriate decisions, and solving complex problems.

Because of the complexity of the task it can be expected that some preservice teachers will have difficulty. The results indicate that a subgroup of these preservice teachers had to rewrite portions of the unit plan two or more times yet sought less help from course instructors. This subgroup also used traditional means of student assessment and received some negative feedback from their students on their unit.

These subjects had difficulty throughout the process of conceptualization, planning, and implementation. Because they did not voluntarily interact with their course instructors about the unit, they had less opportunity to discuss their ideas than did those who sought interaction. They received feedback with each rewrite. However, this feedback probably would have been best implemented when combined with discussions with course instructors at those points where the preservice teacher was having difficulty using the instructor's feedback to make changes in the plan. In the future, course instructors could set up required discussion times. This might assist those who do not voluntarily seek help.

The initial brainstorming of the unit proceeded smoothly. Difficulties first arose when these subjects wrote focus questions. Nearly all were able to write focus questions that addressed social studies ideas but many had difficulty with mathematics and science questions. They also had problems trying to write a unit rationale that supported the inclusion of mathematics and some had difficulty supporting the integration of social studies and science. Social studies educators need to work with mathematics and science educators to remediate these difficulties. Greater efforts are needed to share ideas across content areas and to build the case for interdisciplinary efforts. Part of the problem is due to the focus on single subject teaching in many public schools and at institutions of higher education. These preservice teachers had the most difficulty in moving mathematics out of a subject box. Perhaps part of the reason for their difficulty in creating a rationale for integrating mathematics, and to some extent science with social studies may be a weakness in the content knowledge of these preservice teachers. The research on mathematics anxiety and the limited participation of female students in mathematics and science courses suggests that this group of primarily female subjects may be, on average, weak in these two areas. This weakness would make it difficult for them to construct a rationale for integrating areas in which they are not confident of their expertise. However, no data were collected to support this suggestion. Future researchers should consider collecting data on courses taken in secondary school and in higher education and on grades received in those courses. Survey instruments assessing sense of efficacy in teaching the specific areas, particularly social studies, mathematics, and science should also be informative. Data on courses taken in the social sciences and history should also be collected and then compared to mathematics and science data to determine how preservice teachers' content preparation varies across areas.

Some other difficulties found among these subjects were expected. For example, many could not initially write objectives that clearly addressed expectations for student learning. It is notable, however, that those who had voluntarily met with course instructors during earlier stages of unit planning did not have to rewrite their

objectives. The opportunity to discuss one's ideas appeared to help these preservice teachers clarify their objectives.

A small group of these subjects used only traditional means of student assessment although they were encouraged to use nontraditional assessment. All of this group rewrote their unit rationale and objectives at least twice. Seven received negative feedback from their students about the unit. This group appeared to have great difficulty conceptualizing the unit and in interviews said that they felt uncomfortable using nontraditional means of assessment. Their difficulties suggest a generally weak development of pedagogical knowledge. These preservice teachers need more experience and guidance in order to achieve the levels of pedagogical competence demonstrated by their peers in the methods block.

The cooperating teachers favored continuation of efforts to help methods block students plan and implement an integrated thematic unit. Even so, many expressed a view of social studies as a minor subject, one that could not be taught daily. They held the same view towards science. They also had difficulty thinking of language arts/reading and mathematics as tools to be used in learning social studies, science, and other areas. The influence of high stakes testing and teacher accountability focusing on reading, language arts, and mathematics (Mancino, 1993) and teachers' desire to develop in their students those reading and mathematics skills viewed as basic to functioning in modern society create an environment where social studies and science are considered minor subjects and are likely to remain such. Teachers' views will change only when they are convinced they they will be able to meet testing and accountability goals through integrated curricula that have a social studies and science focus. When stress is placed on meeting testing and accountability goals it is difficult to try something new if there is chance that student performance levels might fall. Preservice training that enables novices to learn to plan, implement, and assess integrated thematic units and involves cooperating teachers in the process, is one way to build a corps of teachers who have the confidence to implement an integrated approach despite pressures toward a single subjects approach.

The integrated thematic units involved in this project represent one step toward interdisciplinary teaching as it has been advocated by Mancino (1993), Fogarty (1991), Alberty and May (1987) and others. Based on pilot work, it was decided that these preservice teachers did not have the pedagogical expertise to plan and implement complete interdisciplinary teaching. The cooperating teachers' difficulty with fully accepting the rationale for the integrated thematic unit teaching suggests that they would be much less likely to accept full interdisciplinary teaching. Certainly, they would not have the pedagogical skills needed to facilitate such teaching by preservice teachers. If initial experiences with planning integrated thematic units involved methods block preservice teachers, a next step toward interdisciplinary teaching could be taken with student teachers. Inservice teachers are most likely to have the pedagogical knowledge required for interdisciplinary teaching and could be assisted in making the transition. A gradual, step-by-step development is advocated here. Based on the results of this study, preservice teachers prior to student teaching appear to have pedagogical knowledge that is too limited to be used to develop interdisciplinary teaching in which social studies is a primary area. There are also concerns about their content knowledge that would have to be addressed much earlier in their program.

Teacher education faculty and cooperating teachers must continue to work together in order to achieve greater acknowledgement of the central role of social studies in the elementary curriculum and to integrate it with other content areas. Much work remains to be done. However, this study indicates that it is possible to assign a central role in the elementary curriculum to social studies and to help preservice teachers in a methods block program construct an integrated thematic unit that ties together diverse parts of the curriculum.

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